

Claims

1. A security document (1) with a security element (2, 3) consisting at least partly of a material ( $M$ ) that is optically changeable by an electric field ( $E$ ) or magnetic field, characterized in that the security document is equipped for the purpose of testing thereof to produce an optical change of the material ( $M$ ) by bringing the security document into an external electric or magnetic field.

2. A security document according to claim 1, characterized in that the optically changeable material ( $M$ ) includes a plurality of particles (8, 9) that are changeable in their position and/or alignment by means of an electric field ( $E$ ) or magnetic field.

3. A security document according to claim 1 or 2, characterized in that the security element (3) includes information (3) applied to the security document (1) and consisting at least partly of the optically changeable material ( $M$ ).

4. A security document according to any of claims 1 to 3, characterized in that the security element (2) includes a security layer (2) consisting at least partly of the optically changeable material ( $M$ ).

5. A security document according to claim 4, characterized in that the security layer has a structure.

6. A security document according to any of claims 3 to 5, characterized in that the security layer (2) and/or the optically changeable information (3) has different colors in dependence on an electric field ( $E$ ) or magnetic field from a certain viewing side.

7. A security document according to any of claims 3 to 6, characterized in that the security layer (2) and/or the optically changeable information (3) is transparent or opaque in dependence on an electric field ( $E$ ).

8. A security document according to any of claims 4 to 7, characterized in that information to be protected is applied to a security layer.

9. A security document according to any of claims 4 to 8, characterized in that a security layer (2) covers information (10) applied to the security document (1).

10. A security document according to any of claims 1 to 9, characterized in that the material is adapted to be brought by irradiation of light into a state in which it is optically changeable by an electric field.

11. A security document according to any of claims 2 to 10, characterized in that the particles of optically changeable material are embedded in a substance that produces an electric field upon irradiation of light.

12. A security document according to any of claims 1 to 11, characterized by a layer that produces an electric field upon irradiation of light.

13. A security document according to any of claims 1 to 12, characterized in that the optically changeable material is soluble by organic media and/or water.

14. A method for producing a security document (1) with a security element (2, 3), the security element (2, 3) being produced using a material ( $M$ ) that is optically changeable by an electric field ( $E$ ) or magnetic field, the optically changeable material ( $M$ ) including a plurality of particles (8, 9) that are changeable in their position and/or alignment by means of an electric field ( $E$ ) or magnetic field, the optically changeable material ( $M$ ) being produced by enclosing the particles (8, 9) in microcapsules (7) and incorporating them in a binder (6), characterized in that for activating the optically changeable material ( $M$ ) the microcapsules (7) are brought by a swelling agent into a swollen state in which the particles (8, 9) are supported movably in the microcapsules (7), the optically changeable material ( $M$ ) being applied to the security document (1) in a nonactivated state.

15. A method according to claim 14, characterized in that for producing the optically changeable material ( $M$ ) the particles (8, 9) are incorporated in an ink or toner as pigments.

16. A method according to either of claims 14 and 15, characterized in that the security element (3) applied to the security document (1) using the optically changeable material (*M*) is information (3).

17. A method according to any of claims 14 to 16, characterized in that the security element (2) applied to the security document (1) using the optically changeable material (*M*) is a security layer (2).

18. A method according to any of claims 14 to 17, characterized in that the security layer and/or information is produced on the security document by means of a nonactivated optically changeable material, and the security document is treated with a swelling agent to activate the optically changeable material.

19. A method according to any of claims 14 to 17, characterized in that the security layer and/or information is produced on the security document by means of a material including the nonactivated optically changeable material and microcapsules containing the swelling agent required for activation, and activation of the optically changeable material on the document is effected by destroying the microcapsules with the swelling agent.

20. A test method for testing a security document according to any of claims 1 to 13, characterized in that the security document (1) is exposed for testing purposes to an external electric field (*E*) or magnetic field.

21. A test method according to claim 20, characterized in that the electric or magnetic field is structured.